

# Exhibit 4

Claim	Analysis
<p>[1.1] A wireless communications system which includes an integrated monitoring circuit, the wireless communication system comprising:</p>	<p>To the extent preamble is limiting, LG Electronics (“Defendant”) makes, uses, sells and/or offers for sale a wireless communications system which includes an integrated monitoring circuit.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, Defendant provides Smart Refrigerator LFXS30766S<sup>1</sup> which comprises inbuilt sensors in order to diagnose its internals for any malfunction. Further, LG ThinQ app is provided to connect to the Smart Refrigerator LFXS30766S using smartphone and diagnose its internals by using Smart Diagnosis option in the app. When Smart Diagnosis option is selected, a communication between server and Smart Refrigerator LFXS30766S is established to check for any possible errors and after diagnostic period is over, a message with alert is sent to the user if an error is found.</p>

<sup>1</sup> While Smart Refrigerator LFXS30766S has been used as an exemplary infringing product, all LG refrigerators including but not limited to LRMVC2306D, LRMVS3006S, SRFVC2406S, LSSB2692ST, LRFXS2503S, LRFVC2406S, LRFVS3006S, LMXS28596D, LFXC22596S, LFXS26973D, LFXC22526D, LFXS26596S, LMNS14420V, LMXS28626D, LSXC22396S, LSXS26396S and/or LSXC22426S as well as variants and versions of these products have same functionality. The presently charted exemplary infringing product is representative for purposes of illustrating infringement of the other LG devices.

HOME / Kitchen / Refrigerators / LFXS30766S



Source: <https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#>

**SUMMARY**

Door Type	French 3-Door
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SmartThinQ®	Yes
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Total Capacity	29.6
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ENERGY STAR® Qualified	Yes
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SmartDiagnosis™	Yes
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Source: <https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#>

Refrigerator Type	Door-in-Door®
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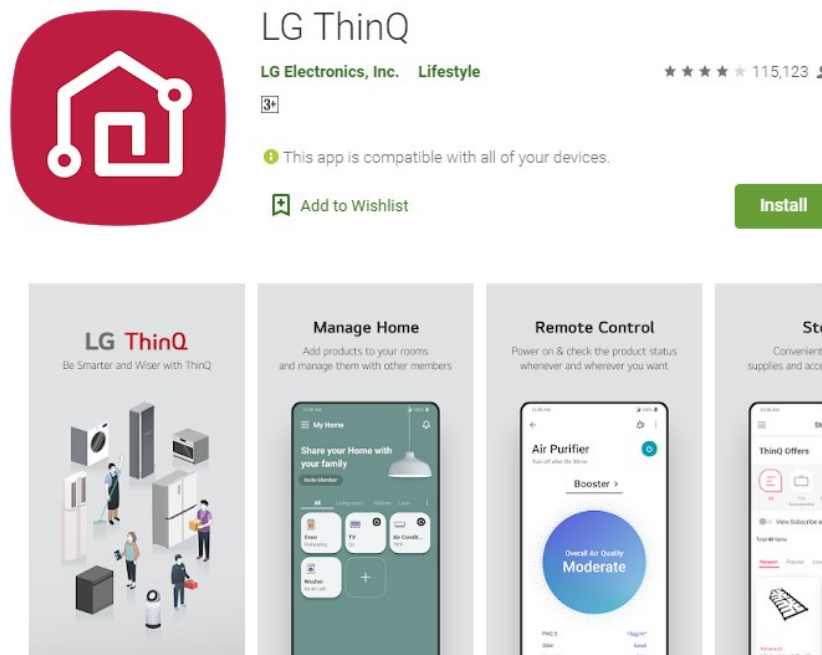
wi-fi Enabled	Yes
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Ice & Water Dispenser	Yes
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Standard Depth	Yes
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ADA Compliant	Yes
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Source: <https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#>



Source: [https://play.google.com/store/apps/details?id=com.lgeha.nuts&hl=en\\_US](https://play.google.com/store/apps/details?id=com.lgeha.nuts&hl=en_US)



① 'Tap 'Smart Diagnosis' menu on the bottom.

② 'Proceed by choosing "Wi-Fi Diagnosis" or "Audible Diagnosis".

③ Check Smart Diagnosis results.

Source:

[http://download.lghomechat.com/manual/en/LG\\_HomeChat\\_Refrigerator\\_Manual.pdf](http://download.lghomechat.com/manual/en/LG_HomeChat_Refrigerator_Manual.pdf), page 18

	<h2>LG Range - What is Smart Diagnosis &amp; How to Use it</h2> <p>[Narrator]  Welcome to the LG customer support channel.  Your LG smart range comes equipped with a smart diagnosis system.  In this video we'll explain what smart diagnosis is, and how you can use it with your smartphone.  The smart diagnosis system or STS allows you to troubleshoot your clients without the need to call and schedule a visit from the service technician.  SDS equipped appliances can transmit an audible digital signal that our smart phone app can record and analyze.  The diagnosis signal can be transmitted and analyzed over Wi-Fi as well.  After diagnosis, the phone app will provide you with troubleshooting steps based on the information transmitted by the appliance.  If you notice anything unusual about your new range or feel that it's not performing as it should you can use the STS to check for any errors without having to place a call to the service center.  To perform the diagnosis, you'll have 2 options.  A Wi-Fi Diagnosis, or an Audible Diagnosis.  When performing either method, make sure that the range is not in use and that the unit is cooled to room temperature.  First, the Wi-Fi option.  This option is the easiest method of the 2.  The signal from your smart range is transmitted over your home wireless network and our servers analyze the signal to diagnose any issues and then relay that information to your smart phone app.</p> <p>Source: <a href="https://www.lg.com/us/support/video-tutorials/lg-range-what-is-smart-diagnosis-how-to-use-it-CT00000303-1367417179055">https://www.lg.com/us/support/video-tutorials/lg-range-what-is-smart-diagnosis-how-to-use-it-CT00000303-1367417179055</a></p> <p>Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Defendant.</p>
<p>[1.2] (a) a setup circuit for configuring and enabling a monitor mode for a wireless communications transmitter;</p>	<p>Defendant provides a setup circuit for configuring and enabling a monitor mode for a wireless communications transmitter.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, Defendant's Smart Refrigerator LFXS30766S ("wireless communications transmitter") comprises a circuit which allows user to enable the Smart Diagnosis mode ("monitor mode") through ThinQ app. When user selects the option of Smart Diagnosis, sensors in the Smart Refrigerator LFXS30766S starts diagnosing its internals to check for any malfunction.</p>

## SUMMARY

Door Type	French 3-Door
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SmartThinQ®	Yes
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Total Capacity	29.6
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ENERGY STAR® Qualified	Yes
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SmartDiagnosis™	Yes
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Source: <https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#>

Refrigerator Type	Door-in-Door®
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wi-fi Enabled	Yes
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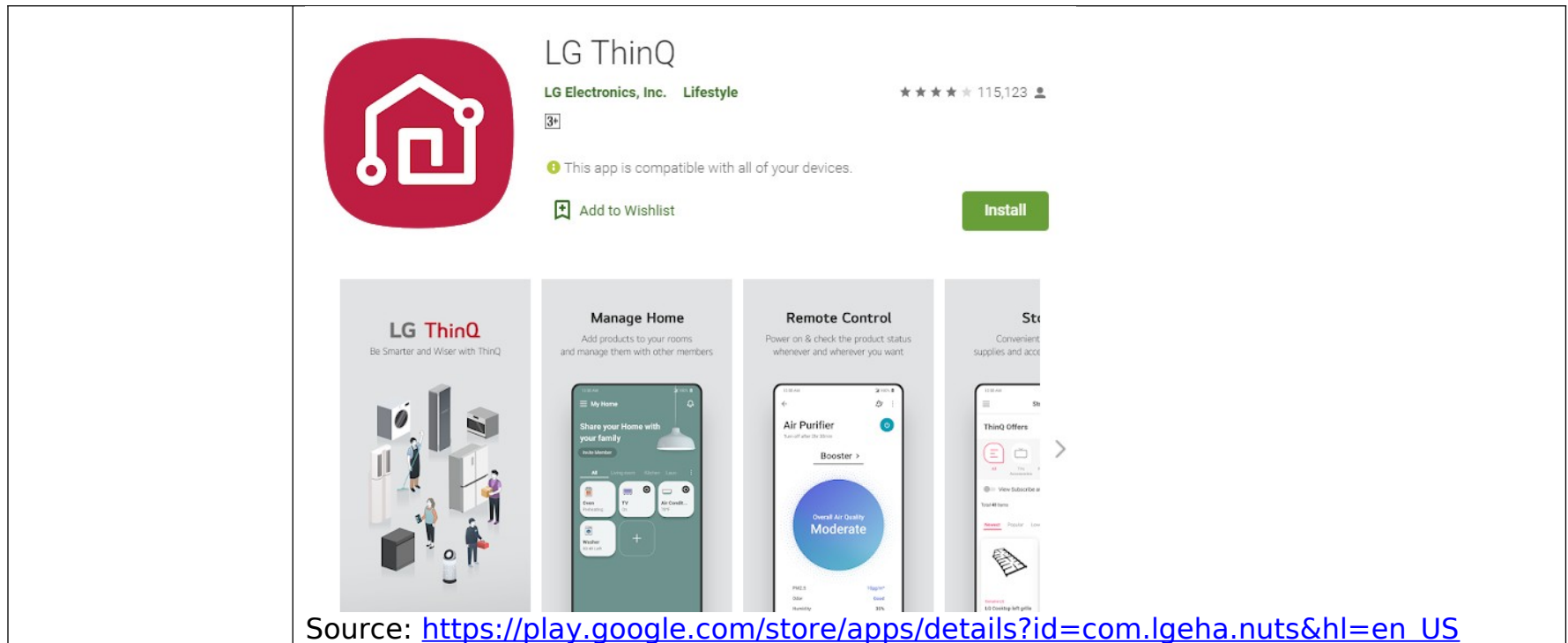
Ice & Water Dispenser	Yes
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Standard Depth	Yes
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ADA Compliant	Yes
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Source: <https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#>







① 'Tap 'Smart Diagnosis' menu on the bottom.

② 'Proceed by choosing "Wi-Fi Diagnosis" or "Audible Diagnosis".


③ Check Smart Diagnosis results.

Source:

[http://download.lghomechat.com/manual/en/LG\\_HomeChat\\_Refrigerator\\_Manual.pdf](http://download.lghomechat.com/manual/en/LG_HomeChat_Refrigerator_Manual.pdf), page 18

	<h2>LG Range - What is Smart Diagnosis &amp; How to Use it</h2> <p>[Narrator]  Welcome to the LG customer support channel.  Your LG smart range comes equipped with a smart diagnosis system.  In this video we'll explain what smart diagnosis is, and how you can use it with your smartphone.  The smart diagnosis system or STS allows you to troubleshoot your clients without the need to call and schedule a visit from the service technician.  SDS equipped appliances can transmit an audible digital signal that our smart phone app can record and analyze.  The diagnosis signal can be transmitted and analyzed over Wi-Fi as well.  After diagnosis, the phone app will provide you with troubleshooting steps based on the information transmitted by the appliance.  If you notice anything unusual about your new range or feel that it's not performing as it should you can use the STS to check for any errors without having to place a call to the service center.  To perform the diagnosis, you'll have 2 options.  A Wi-Fi Diagnosis, or an Audible Diagnosis.  When performing either method, make sure that the range is not in use and that the unit is cooled to room temperature.  First, the Wi-Fi option.  This option is the easiest method of the 2.  The signal from your smart range is transmitted over your home wireless network and our servers analyze the signal to diagnose any issues and then relay that information to your smart phone app.</p> <p>Source: <a href="https://www.lg.com/us/support/video-tutorials/lg-range-what-is-smart-diagnosis-how-to-use-it-CT00000303-1367417179055">https://www.lg.com/us/support/video-tutorials/lg-range-what-is-smart-diagnosis-how-to-use-it-CT00000303-1367417179055</a></p> <p>Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Defendant.</p>
<p>[1.3] (b) a detection routine executing on an Internet based server for detecting sensory data signals transmitted by said wireless communications transmitter and originating from a monitored area</p>	<p>Defendant provides a detection routine executing on an Internet based server for detecting sensory data signals transmitted by said wireless communications transmitter and originating from a monitored area when said monitor mode is enabled.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, Defendant's Smart Refrigerator LFXS30766S ("wireless communications transmitter") comprises sensors in order to diagnose its internals ("monitored area") for any malfunction. When Smart Diagnosis option is selected, a communication between server and Smart Refrigerator LFXS30766S is established to check for any possible errors. Sensor data from Smart Refrigerator LFXS30766S is sent to the server where it is analysed and processed ("detection routine executing on an Internet based</p>

<p>when said monitor mode is enabled;</p>	<p>server”) and a message with an alert is sent to the user if any error is found.</p> <p><b>SUMMARY</b></p> <table> <tr> <td>Door Type</td><td>French 3-Door</td></tr> <tr> <td>SmartThinQ®</td><td>Yes</td></tr> <tr> <td>Total Capacity</td><td>29.6</td></tr> <tr> <td>ENERGY STAR® Qualified</td><td>Yes</td></tr> <tr> <td>SmartDiagnosis™</td><td>Yes</td></tr> </table> <p>Source: <a href="https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#">https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#</a></p> <table> <tr> <td>Refrigerator Type</td><td>Door-in-Door®</td></tr> <tr> <td>wi-fi Enabled</td><td>Yes</td></tr> <tr> <td>Ice &amp; Water Dispenser</td><td>Yes</td></tr> <tr> <td>Standard Depth</td><td>Yes</td></tr> <tr> <td>ADA Compliant</td><td>Yes</td></tr> </table> <p>Source: <a href="https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#">https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#</a></p>	Door Type	French 3-Door	SmartThinQ®	Yes	Total Capacity	29.6	ENERGY STAR® Qualified	Yes	SmartDiagnosis™	Yes	Refrigerator Type	Door-in-Door®	wi-fi Enabled	Yes	Ice & Water Dispenser	Yes	Standard Depth	Yes	ADA Compliant	Yes
Door Type	French 3-Door																				
SmartThinQ®	Yes																				
Total Capacity	29.6																				
ENERGY STAR® Qualified	Yes																				
SmartDiagnosis™	Yes																				
Refrigerator Type	Door-in-Door®																				
wi-fi Enabled	Yes																				
Ice & Water Dispenser	Yes																				
Standard Depth	Yes																				
ADA Compliant	Yes																				



## LG ThinQ

LG Electronics, Inc. Lifestyle

★★★★☆ 115,123

3+


This app is compatible with all of your devices.

Add to Wishlist

Install


### LG ThinQ

Be Smarter and Wiser with ThinQ



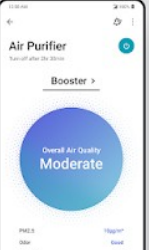
### Manage Home

Add products to your rooms and manage them with other members




### Remote Control

Power on & check the product status whenever and wherever you want



### Store

Convenient supplies and accessories



Source: [https://play.google.com/store/apps/details?id=com.lgeha.nuts&hl=en\\_US](https://play.google.com/store/apps/details?id=com.lgeha.nuts&hl=en_US)



① 'Tap 'Smart Diagnosis' menu on the bottom.

② 'Proceed by choosing "Wi-Fi Diagnosis" or "Audible Diagnosis".

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Source:

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	<h2>LG Range - What is Smart Diagnosis &amp; How to Use it</h2> <p>[Narrator]  Welcome to the LG customer support channel.  Your LG smart range comes equipped with a smart diagnosis system.  In this video we'll explain what smart diagnosis is, and how you can use it with your smartphone.  The smart diagnosis system or STS allows you to troubleshoot your clients without the need to call and schedule a visit from the service technician.  SDS equipped appliances can transmit an audible digital signal that our smart phone app can record and analyze.  The diagnosis signal can be transmitted and analyzed over Wi-Fi as well.  After diagnosis, the phone app will provide you with troubleshooting steps based on the information transmitted by the appliance.  If you notice anything unusual about your new range or feel that it's not performing as it should you can use the STS to check for any errors without having to place a call to the service center.  To perform the diagnosis, you'll have 2 options.  A Wi-Fi Diagnosis, or an Audible Diagnosis.  When performing either method, make sure that the range is not in use and that the unit is cooled to room temperature.  First, the Wi-Fi option.  This option is the easiest method of the 2.  The signal from your smart range is transmitted over your home wireless network and our servers analyze the signal to diagnose any issues and then relay that information to your smart phone app.</p> <p>Source: <a href="https://www.lg.com/us/support/video-tutorials/lg-range-what-is-smart-diagnosis-how-to-use-it-CT00000303-1367417179055">https://www.lg.com/us/support/video-tutorials/lg-range-what-is-smart-diagnosis-how-to-use-it-CT00000303-1367417179055</a></p> <p>Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Defendant.</p>
<p>[1.4] (c) a set of selectable monitor mode control options, which options include a user selectable threshold required for an alert to be triggered; wherein said monitor mode</p>	<p>Defendant provides a set of selectable monitor mode control options, which options include a user selectable threshold required for an alert to be triggered, wherein said monitor mode includes an option for controlling the detection circuit to enable said monitor mode only during a specified period, which begins at a first time and lasts for a first time duration, further wherein monitor mode control options permit a user to receive alerts over a low bandwidth text-based communications network.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, Defendant's Smart Refrigerator LFXS30766S connected with ThinQ app, provides user an option to perform Smart Diagnosis. Smart Diagnosis gives two options to choose from - Wi-Fi Diagnosis and Audible Diagnosis - in order to diagnose the</p>

includes an option for controlling the detection circuit to enable said monitor mode only during a specified period, which begins at a first time and lasts for a first time duration; further wherein monitor mode control options permit a user to receive alerts over a low bandwidth text-based communications network;

internals of the Smart Refrigerator LFXS30766S. Upon information and belief, when user selects one of the two options, a threshold is selected to be compared to the sensor data from Smart Refrigerator LFXS30766S so that an alert is generated if sensor data is more than the threshold value.

Further, the Smart diagnosis runs for a limited period during which complete diagnosis of internals of Smart Refrigerator LFXS30766S through inbuilt sensors is finished. If some error is detected, the user receives alerts in the ThinQ app over a message-based network.

### SUMMARY

Door Type	French 3-Door
SmartThinQ®	Yes
Total Capacity	29.6
ENERGY STAR® Qualified	Yes
SmartDiagnosis™	Yes

Source: <https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#>



Refrigerator Type	Door-in-Door®
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wi-fi Enabled	Yes
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Ice & Water Dispenser	Yes
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Standard Depth	Yes
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ADA Compliant	Yes
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Source: <https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#>



LG ThinQ

LG Electronics, Inc. Lifestyle

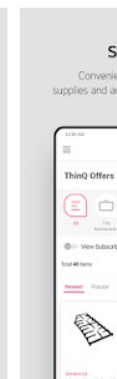
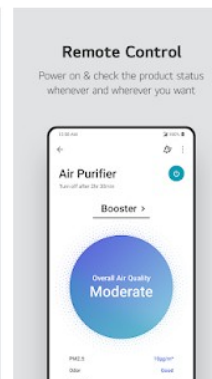
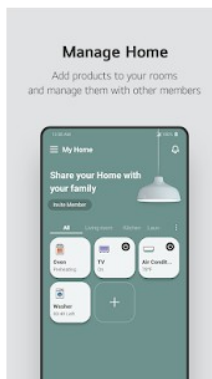
★★★★★ 115,123

3+

This app is compatible with all of your devices.

Add to Wishlist

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	<h2>LG Range - What is Smart Diagnosis &amp; How to Use it</h2> <p>[Narrator]  Welcome to the LG customer support channel.  Your LG smart range comes equipped with a smart diagnosis system.  In this video we'll explain what smart diagnosis is, and how you can use it with your smartphone.  The smart diagnosis system or STS allows you to troubleshoot your clients without the need to call and schedule a visit from the service technician.  SDS equipped appliances can transmit an audible digital signal that our smart phone app can record and analyze.  The diagnosis signal can be transmitted and analyzed over Wi-Fi as well.  After diagnosis, the phone app will provide you with troubleshooting steps based on the information transmitted by the appliance.  If you notice anything unusual about your new range or feel that it's not performing as it should you can use the STS to check for any errors without having to place a call to the service center.  To perform the diagnosis, you'll have 2 options.  A Wi-Fi Diagnosis, or an Audible Diagnosis.  When performing either method, make sure that the range is not in use and that the unit is cooled to room temperature.  First, the Wi-Fi option.  This option is the easiest method of the 2.  The signal from your smart range is transmitted over your home wireless network and our servers analyze the signal to diagnose any issues and then relay that information to your smart phone app.</p> <p>Source: <a href="https://www.lg.com/us/support/video-tutorials/lg-range-what-is-smart-diagnosis-how-to-use-it-CT00000303-1367417179055">https://www.lg.com/us/support/video-tutorials/lg-range-what-is-smart-diagnosis-how-to-use-it-CT00000303-1367417179055</a></p> <p>Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Defendant.</p>
<p>[1.5] (d) an alert generator circuit for generating an alert when said sensory data exceeds said user selectable threshold and when said monitor mode is enabled.</p>	<p>Defendant provides an alert generator circuit for generating an alert when said sensory data exceeds said user selectable threshold and when said monitor mode is enabled.</p> <p>This element is infringed literally, or in the alternative, under the doctrine of equivalents.</p> <p>For example, when Smart Diagnosis is run ("monitor mode is enabled"), the data from the sensors in Smart Refrigerator LFXS30766S is sent over to the server where it is analysed and processed (compared to threshold) and an alert is generated if the sensor data is out of the safety limit. The alert is sent to the user through the ThinQ app.</p>

## SUMMARY

Door Type	French 3-Door
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SmartThinQ®	Yes
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Total Capacity	29.6
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ENERGY STAR® Qualified	Yes
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SmartDiagnosis™	Yes
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Refrigerator Type	Door-in-Door®
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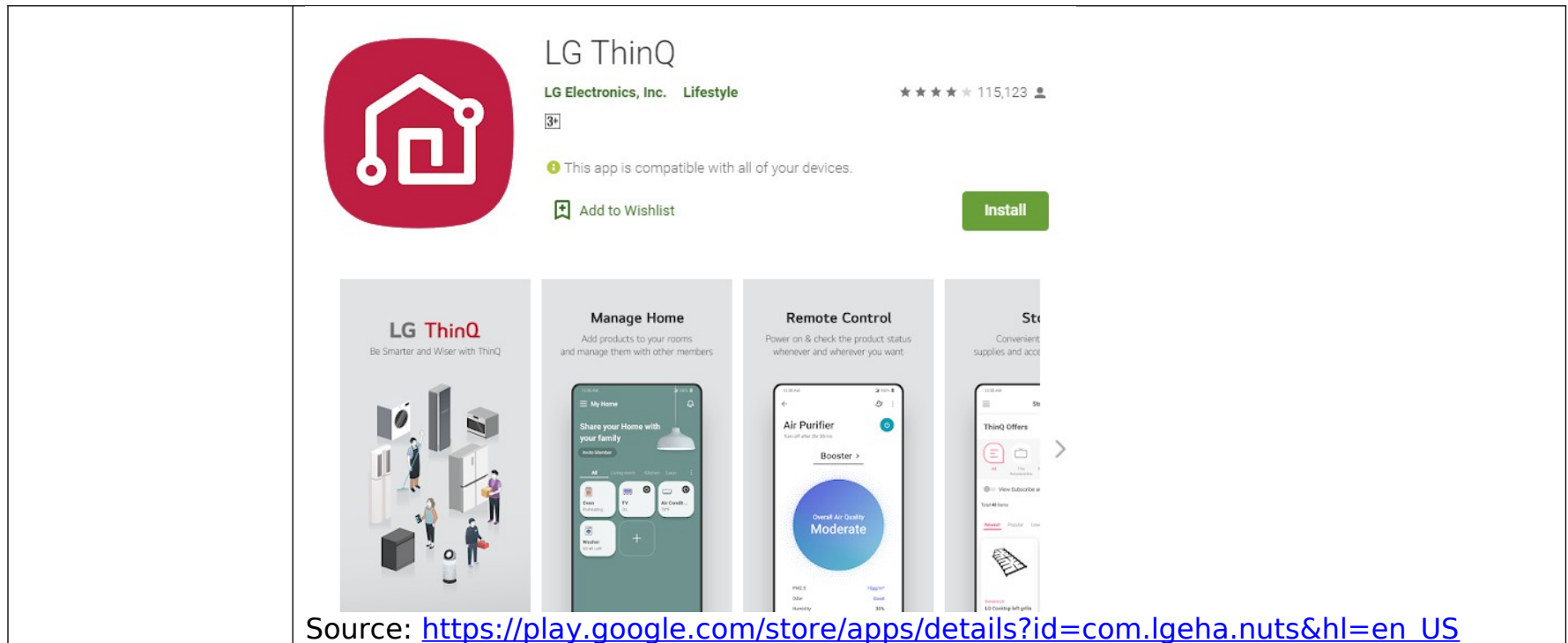
wi-fi Enabled	Yes
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Ice & Water Dispenser	Yes
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Standard Depth	Yes
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ADA Compliant	Yes
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① 'Tap 'Smart Diagnosis' menu on the bottom.

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## LG Range - What is Smart Diagnosis & How to Use it

[Narrator]

Welcome to the LG customer support channel.

Your LG smart range comes equipped with a smart diagnosis system.

In this video we'll explain what smart diagnosis is, and how you can use it with your smartphone.

The smart diagnosis system or STS allows you to troubleshoot your clients without the need to call and schedule a visit from the service technician.

SDS equipped appliances can transmit an audible digital signal that our smart phone app can record and analyze.

The diagnosis signal can be transmitted and analyzed over Wi-Fi as well.

After diagnosis, the phone app will provide you with troubleshooting steps based on the information transmitted by the appliance.

If you notice anything unusual about your new range or feel that it's not performing as it should you can use the STS to check for any errors without having to place a call to the service center.

To perform the diagnosis, you'll have 2 options.

A Wi-Fi Diagnosis, or an Audible Diagnosis.

When performing either method, make sure that the range is not in use and that the unit is cooled to room temperature.

First, the Wi-Fi option.

This option is the easiest method of the 2.

The signal from your smart range is transmitted over your home wireless network and our servers analyze the signal to diagnose any issues and then relay that information to your smart phone app.

Source: <https://www.lg.com/us/support/video-tutorials/lg-range-what-is-smart-diagnosis-how-to-use-it-CT00000303-1367417179055>

Further, to the extent this element is performed at least in part by Defendant's software source code, Plaintiff shall supplement these contentions pursuant to production of such source code by the Defendant.

## 1. List of References

1. Smart Refrigerator LFXS30766S, <https://www.lg.com/us/refrigerators/lg-LFXS30766S-french-3-door-refrigerator#>, last accessed on October 1, 2020.
2. ThinQ App, [https://play.google.com/store/apps/details?id=com.lgeha.nuts&hl=en\\_US](https://play.google.com/store/apps/details?id=com.lgeha.nuts&hl=en_US), last accessed on October 1, 2020.
3. Smart Diagnosis, [http://download.lghomechat.com/manual/en/LG\\_HomeChat\\_Refrigerator\\_Manual.pdf](http://download.lghomechat.com/manual/en/LG_HomeChat_Refrigerator_Manual.pdf), last accessed on October 1, 2020.
4. Working of Smart Diagnosis, <https://www.lg.com/us/support/video-tutorials/lg-range-what-is-smart-diagnosis-how-to-use-it-CT00000303-1367417179055>, last accessed on October 1, 2020.